What is claimed is:

1. A method for manufacturing a silicon/germanium semiconductor transistor on a silicon substrate, comprising the steps of:

forming a gate oxide on the substrate;

implanting germanium into the substrate, only beneath the gate oxide, to form an implanted region;

annealing the substrate to form $Si_{1-x}Ge_x$ in the implanted region, having a germanium molar fraction of x;

forming a gate on the gate oxide; and

forming source/drain regions in the substrate.

2. The method of claim 1, wherein the implanting step comprises implanting germanium at a dose of approximately $2 \times 10^{16}$ atoms/cm$^2$.

3. The method of claim 1, wherein the implanting step comprises implanting germanium at an energy of approximately 20 to 100 keV.

4. The method of claim 1, wherein the implanting step comprises implanting germanium to a depth of approximately 100 to 1,000 angstroms.

5. The method of claim 1, wherein the implanting step comprises implanting germanium to a depth of approximately 300 angstroms.

6. The method of claim 1, wherein the annealing step comprises annealing in a furnace at a temperature of approximately 450 to 700 degrees Celsius.

7. The method of claim 1, wherein the annealing step comprises annealing in a furnace at a temperature of approximately 550 degrees Celsius.

~~8. The method of claim 1, wherein the $Si_{1-x}Ge_x$ formed is approximately 100 to 1,000 angstroms thick.~~

~~9. The method of claim 1, wherein the molar fraction of germanium is approximately 0.2.~~

~~10. The method of claim 1, wherein the silicon/germanium semiconductor transistor is a p-channel metal-oxide-semiconductor transistor.~~

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11. A semiconductor transistor, comprising:

a silicon substrate;

a gate oxide, coupled to the substrate;

a gate, coupled to the gate oxide;

source/drain regions formed in the substrate on opposite sides of the gate; and

a $Si_{1-x}Ge_x$ channel region, having a germanium molar fraction of x, and formed in the substrate, underneath the gate oxide and between the source/drain regions.

12. The transistor of claim 11, wherein the transistor is a p-channel metal-oxide-semiconductor transistor.

13. The transistor of claim 11, wherein the $Si_{1-x}Ge_x$ channel is approximately 100 to 1,000 angstroms thick.

14. The transistor of claim 11, wherein the molar fraction of germanium is approximately 0.2.

15. A method for forming a p-channel in a metal-oxide-semiconductor transistor, comprising the steps of:

implanting germanium into the channel region of a transistor formed on a silicon substrate, through a gate oxide, to form an implanted region; and

annealing the implanted region to form $Si_{1-x}Ge_x$ in the channel region, having a molar fraction of germanium, x.

16. The method of claim 15, wherein the implanting step comprises implanting germanium at a dose of approximately 2 X $10^{16}$ atoms/$cm^2$.

17. The method of claim 15, wherein the implanting step comprises implanting germanium at an energy of approximately 20 to 100 keV.

18. The method of claim 15, wherein the implanting step comprises implanting germanium to a depth of approximately 100 to 1,000 angstroms.

19. The method of claim 15, wherein the implanting step comprises implanting germanium to a depth of approximately 300 angstroms.

20. The method of claim 15, wherein the annealing step comprises annealing in a furnace at a temperature of approximately 450 to 700 degrees Celsius.

21. The method of claim 15, wherein the annealing step comprises annealing in a furnace at a temperature of approximately 550 degrees Celsius.

22. The method of claim 15, wherein the $Si_{1-x}Ge_x$ channel is approximately 100 to 1,000 angstroms thick.

23. The method of claim 15, wherein the molar fraction of germanium is approximately 0.2.

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